

# Program Commitment Agreement

## Explorer Program

June 1999

It is the responsibility of each of the signing parties to notify the other in the event that a commitment cannot be met and to indicate the timely renegotiation of the terms of this agreement.

Agreement:

Edward J. Witen

Associate Administrator  
Space Science Enterprise

11-24-99

Date

Paul Hollen

Administrator

NOV 24, 1999

Date

# PROGRAM COMMITMENT AGREEMENT

## Explorer

### 1. PROGRAM OBJECTIVES

The Explorer Program is designed to accomplish frequent, high-quality space science investigations, using innovative and efficient management approaches. The Program's prime objective is to enhance our understanding of space physics and astronomy. In the process, it seeks to substantially reduce total mission cost and development time (compared to past physics and astronomy missions) and improve performance through the use of new technology and through commitment to, and control of, design, development and operations costs. Finally, it seeks to enhance public awareness of, and appreciation for, space exploration and to incorporate educational and public outreach activities as integral parts of space science investigations.

Explorer missions are to provide frequent flight opportunities for scientific investigations from space. The Explorers Program develops scientific missions of modest programmatic scope within the following space science themes:

- Astronomical Search for Origins
- The Sun – Earth Connection
- Structure and Evolution of the Universe

### 2. PROGRAM OVERVIEW

The Explorer Program is an outgrowth of a Space Science Enterprise effort to develop a science program of frequent, small satellite missions that will perform high-quality scientific investigations. The program emphasizes missions that can be accomplished under the control of the scientific research community. It seeks to control total mission life cycle costs and improve performance through the use of new technology, through strict control of costs, and through more efficient management by assigning increased responsibility to the Principal Investigators (PI's).

The scientific goals of space physics and astronomy science within the Office of Space Science (OSS) are generally contained in *The Space Science Enterprise Strategic Plan*, dated November 1997.

The Explorer Program customer base is centered in the space physics and astronomy science communities representing the three space science themes mentioned above. The goals and strategies outlined in the Strategic Plan encompass a wide range of scientific questions spanning many scientific disciplines.

NASA seeks to address these questions by supporting investigations in several broad categories; however, the Explorers program solicits only those investigations which lead to flight projects that investigate space physics and astronomy. The Program is composed of a long-term series of space science missions that are independent, but share a common funding and management structure.

The Explorer Program will carry out flight missions, firmly controlling the total cost within an initially determined cost cap. The Explorer Program is designed to accomplish frequent, high quality space science investigations utilizing innovative, streamlined, and efficient management approaches.

The Explorer Program provides several classes of projects:

Medium-class Explorers (MIDEX) – are investigations characterized by definition, development, launch service, and mission operations and data analysis costs not to exceed \$150 million (in Fiscal Year 2000 dollars) total cost to NASA.

Small Explorers (SMEX) – are investigations characterized by definition, development, launch service, and mission operations and data analysis costs not to exceed \$75 million (in Fiscal Year 2000 dollars) total cost to NASA.

University-class Explorers (UNEX) – are investigations characterized by a definition, development, launch service, and mission operations and data analysis costs not to exceed \$15.0M (real year dollars) total cost to NASA. UNEX missions will be launched by a variety of low cost methods.

Missions of Opportunity (MO) – are investigations characterized by being part of a non-Space Science mission of any size, and having a NASA cost under \$35 million (in Fiscal Year 2000 dollars) total cost to NASA. These missions are conducted on a no-exchange-of-funds basis with the organization sponsoring the mission. NASA intends to solicit proposals for Missions of Opportunity with each Announcement of Opportunity (AO) issued for UNEX, SMEX, and MIDEX investigations

Technology - the overall objective of the Explorers Technology Program is to identify, develop, infuse and transfer technologies that enable or enhance opportunities for frequent scientific investigations while creating partnerships to ensure maximum scientific and economic benefit from the NASA Space Science Program. The primary goal of the Technology Program is the development of new technology that leads to lower mission costs.

The current Explorer missions in Development are shown in Table 1:

Table 1: Current Explorer Projects

Explorer Project Name	Mission Objective	Launch Date	Implementing Organizations	Mission Status
1. FUSE	High resolution, Far UV spectroscopy	6/24/99	JHU, OSC, CSA, CNESS	Launched – In flight checkout
2. IMAGE	Multi-energy Magnetospheric Imaging	2/00	SwRI, LMMC, GSFC	Integrated, in storage awaiting launch
3. MAP	Detailed mapping of cosmic microwave radiation	11/00	GSFC, Princeton	In Integration
4. GALEX	Survey of star formation	9/01	Cal Tech, JPL, OSC	In subsystem development
5. HESSI	High energy solar processes	7/00	UCB, GSFC, PSI, Spectrum Astro	In integration
6. CATSAT	Study of gamma-ray bursters	7/01	U. of NH, USRA	Integrated, awaiting launch
7. TWINS	magnetosphere stereoscopic imaging	3/03 & 9/04	LANL, SwRI	In subsystem development
8. HETE II	Multiwavelength study of gamma-ray bursters	1/00	MIT	Integrated, awaiting launch
9. CHIPS	Local bubble cooling	2001	UCB	In Phase A
10. IMEX	Geomagnetic storm effects in inner magnetosphere	2001	U. of Minn., U. of Colorado	In Phase A

### **3. PROGRAM AUTHORITY**

The AA for Space science has assigned GSFC to be the Lead center for the Explorer Program. The GSFC Center Director is responsible for overall Program success and is accountable to the AA for Space Science. The GSFC Center Director holds the Explorer Program Manager accountable for directing a program which meets Agency, Center, and Explorer Program requirements within established cost, schedule, and performance boundaries. The GSFC Center Director shall certify the flight readiness of each Explorer mission to the AA for Space Science. For UNEX missions, the responsibility for flight readiness certification to the AA for OSS is delegated to the Explorer Program Manager.

Program authority is delegated from the Associate Administrator for the Office of Space Science (AA/OSS) through the GSFC Center Director to the Explorer Program Manager within the Flight Projects Directorate at GSFC. The Principal Investigator (PI) for each Explorer project is responsible for the overall success of the project and is accountable to the AA/OSS for the scientific success and to the GSFC Center Director for the programmatic success. The GSFC Program Management Council (PMC) is the governing PMC for the Explorer Program and each Explorer project.

The Explorer Program Office is responsible for the management of each Explorer project through development, launch, and on-orbit checkout. The Program Office develops the integrated budgetary requirements and recommendations for the Explorer Program and defines the Program content and schedule based on OSS budgetary guidelines. Resource requirements for each project from definition and development through mission operations are defined as including funding, manpower, facilities, technical and institutional support, launch facilities, and other resources such as tracking and data capabilities and services which make mission success possible. Program risks and internal agreements are indicated as well.

The Program Office establishes operational policies for the Explorer Program, assures appropriate independent review of Explorer projects, monitors the progress of each project, reports project and program status to GSFC and NASA management, recommends necessary corrective and preventative actions, and provides access to GSFC and NASA expertise and support for the PIs.

The Program Office is responsible for ensuring the PI for each Explorer project is staying within his committed cost, schedule, performance, reliability, and safety requirements. The Program Office promotes efficiencies through the application of innovative management practices, the identification and implementation of inter-mission synergies, and the capture and application of lessons learned.

The Program Office supports OSS in the preparation of Explorer AOs, NASA Research Announcements (NRAs), and NASA interagency and international agreements associated with Explorer Projects. The Program Office manages the Explorer Technology Program. The Program Office appoints a Project Manager who is responsible for the above actions for each mission.

#### **4. TECHNICAL PERFORMANCE COMMITMENTS**

- (a) The Explorer program shall launch at least one MIDEX, one SMEX, and one UNEX class mission per year, commensurate with the availability of adequate funding. The launch of Missions of Opportunity may substitute for other Explorer classes as appropriate, based on when they were selected, funding profiles, and expected launch dates.
- (b) Explorer Projects encourage a wide variety of methods for access to space. Expendable launch vehicles (ELVs), space shuttle payloads, spacecraft from other programs, Long Duration Balloons, and sub-orbital flights are all encouraged as ways to increase the program flexibility and maximize flight opportunities for space science. Each Explorer AO describes the launch vehicle or appropriate access to space for the mission classes included in the announcement. OSS provides access to space and launch vehicle funding. These funds are part of the total cost cap for each mission. Foreign launch vehicles may be utilized only if contributed by the foreign organization and the launch vehicle meets NASA quality and reliability standards. NASA will not purchase launch vehicles from foreign sources.
- (c) Explorer projects shall be complete missions, including provision of the instrument, science teams, spacecraft and supporting subsystems, launch vehicle, mission operations, tracking support, and data analysis and archiving. The only exception to this requirement is the general Space Science provision in all AO's to allow for MO's which provide science investigations and instruments on non-Space Science missions.
- (d) Projects shall be designed, within cost and schedule constraints, to emphasize mission success by incorporating sufficient margins, reserves, content resiliency, and descope capabilities.
- (e) Once selected, failure to maintain reasonable progress in performance requirements on an agreed upon schedule, or failure to operate within cost commitments may be cause for termination of the project.
- (f) Participation by non-US individuals and organizations as team members in the Explorers program investigation will be permitted.
- (g) In addition to science, Explorers Projects shall identify and provide technological, educational, and/or societal benefits.

- (h) For each mission class, launch shall take place within the following number of months after implementation: UNEX - 24, SMEX - 27, and MIDEX - 40.
- (i) The requirements of NASA Policy Directive (NPD) 7120.4A and NASA Procedures and Guidelines (NPG) 7120.5A apply to the Program as tailored by this document and the Explorers Program Plan.
- (j) There will be no period of proprietary data rights for Explorers investigations. Mission teams will be allowed a brief validation period for collecting the scientific, engineering, and ancillary data and validating the scientific data prior to depositing it in the Data Archival System.
- (k) Program-level requirements on each selected Explorer mission shall be defined in an appendix to the Explorer Program Plan prior to Project Confirmation to enter Implementation.

## **5. SCHEDULE COMMITMENTS**

The current Explorer Program Schedule is shown in Figure 1 and in the Explorer Program Mission set. This schedule and mission set will be updated based on specific changes to the Mission Program-level Requirements Appendix and Program Operating Plan agreements between GSFC and the Space Science Enterprise.

FIGURE 1  
EXPLORERS SCHEDULE - POP 99-1

Announcements of Opportunity

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
MIDEX	▲ 3,4	▲ 5,8	▲ 7,8	▲ 9,10								
SMEX	▲ 6,8	▲ 10,11	▲ 12,13									
UNEX	▲ 1,2	▲ 3-6	▲ 7-10	▲ 11-14								
TECHNOLOGY NRAs	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲

△ = Issued    ▽ = Selected

Launch Schedule

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
MIDEX	FUSE ▲ 6/99	IMAGE ▲ 2/00	MAP ▲ 11/00			MIDEX-3 ▲ 10/03	MIDEX-4 ▲ 10/04	MIDEX-5 ▲ 10/05	MIDEX-6 ▲ 10/06	MIDEX-7 ▲ 10/07		MIDEX-9 ▲ 10/09
SMEX	TRACE ▲ 4/98	SWAS ▲ 12/98	WIRE ▲ 3/99	HESSI ▲ 7/00		SMEX-8 ▲ 7/03	SMEX-9 ▲ 7/04	SMEX-10 ▲ 7/05	SMEX-11 ▲ 7/06	SMEX-12 ▲ 7/07		MIDEX-8 ▲ 10/08
UNEX	SNOE* ▲ 1/98	TERRERS* ▲ 5/99	CHIPS ▲ 6/01	IMEX ▲ 6/01	GALEX ▲ 9/01	UNEX-3 ▲ 4/03	UNEX-4 ▲ 4/03	UNEX-7 ▲ 4/05	UNEX-8 ▲ 4/05	UNEX-11 ▲ 4/07		SMEX-13 ▲ 7/08
			CATSAT* ▲ 7/01			UNEX-5 ▲ 4/04	UNEX-6 ▲ 4/04	UNEX-9 ▲ 4/06	UNEX-10 ▲ 4/06	UNEX-12 ▲ 4/07		UNEX-13 ▲ 4/08
						UNEX-1 ▲ 4/03						UNEX-14 ▲ 4/08
Missions of Opportunity		HETE II ▲ 1/00				TWINS-A ▲ 1ST QTR	TWINS-B ▲ 3RD QTR					

\* - STED1 Missions



# EXPLORERS PROGRAM MISSION

## SET. POP 99-1

<u>Mission</u>	<u>AO Release</u> 1988 Letter	<u>Selection</u>	<u>Contract</u>	<u>End Phase A</u>	<u>Down Select</u>	<u>End Phase B</u>	<u>LRD</u>	<u>End IOC</u>	<u>End Prime Mission</u>
<u>FUSE</u>						11/22/95	3/18/99	5/2/99	05/01/02
<u>MIDEX</u>									
IMAGE	3/27/95	4/12/96	5/10/96	No Ph. A	N/A	2/1/97	2/00	3/00	3/02
MAP	3/27/95	4/12/96	5/10/96	No Ph. A	N/A	8/1/97	11/00	12/00	12/02
MIDEX-3	3/25/98	12/98	1/99	6/99	9/99	6/00	10/03	11/03	11/06
MIDEX-4	3/25/98	12/98	1/99	6/99	9/99	6/01	10/04	11/04	11/07
MIDEX-5	6/00	11/00	12/00	6/01	9/01	6/02	10/05	11/05	11/08
MIDEX-6	6/00	11/00	12/00	6/01	9/01	6/03	10/06	11/06	11/09
MIDEX-7	6/02	11/02	12/02	6/03	9/03	6/04	10/07	11/07	11/10
MIDEX-8	6/02	11/02	12/02	6/03	9/03	6/05	10/08	11/08	11/11
MIDEX-9	6/04	11/04	12/04	6/05	9/05	6/06	10/09	11/09	11/12
MIDEX-10	6/04	11/04	12/04	6/05	9/05	6/07	10/10	11/10	11/13
<u>SMEX</u>									
WIRE	1993 AO								
HESSI	4/16/97	9/97	10/97	1/98	N/A	7/98	3/5/99	4/99	3/01
GALEX	4/16/97	9/97	10/97	4/98	N/A	12/98	7/00	8/00	8/02
SMEX-8	10/99	3/00	4/00	10/00	1/01	7/01	9/01	10/01	10/03
SMEX-9	10/99	3/00	4/00	10/00	1/01	4/02	7/03	8/03	7/05
SMEX-10	10/01	3/02	4/02	10/02	1/03	7/03	7/04	8/04	7/06
SMEX-11	10/01	3/02	4/02	10/02	1/03	4/04	7/05	8/05	8/07
SMEX-12	10/03	3/04	4/04	10/04	1/05	7/05	7/06	8/06	8/08
SMEX-13	10/03	3/04	4/04	10/04	1/05	4/06	7/07	8/07	8/09
							7/08	8/08	8/10

# EXPLORERS PROGRAM MISSION

# SET, POP 99-1

<u>Mission</u>	<u>AO Release</u>	<u>Selection</u>	<u>Contract</u>	<u>End Phase A</u>	<u>Down Select</u>	<u>End Phase B</u>	<u>LRD</u>	<u>End IOC</u>	<u>End Prime Mission</u>
<u>UNEX</u>									
CHIPS	1/5/98	9/4/98	10/98	4/1/99	N/A	7/99	6/01	7/01	7/02
IMEX	1/5/98	9/11/98	10/98	4/1/99	N/A	7/99	6/01	7/01	7/02
UNEX-3	2/00	9/00	10/00	2/01	N/A	8/01	4/03	5/03	5/04
UNEX-4	2/00	9/00	10/00	2/01	N/A	8/01	4/03	5/03	5/04
UNEX-5	2/00	9/00	10/00	6/01	N/A	4/02	4/04	5/04	5/05
UNEX-6	2/00	9/00	10/00	6/01	N/A	4/02	4/04	5/04	5/05
UNEX-7	2/02	9/02	10/02	2/03	N/A	8/03	4/05	5/05	5/06
UNEX-8	2/02	9/02	10/02	2/03	N/A	8/03	4/05	5/05	5/06
UNEX-9	2/02	9/02	10/02	6/03	N/A	4/04	4/06	5/06	5/07
UNEX-10	2/02	9/02	10/02	6/03	N/A	4/04	4/06	5/06	5/07
UNEX-11	2/04	9/04	10/04	2/05	N/A	8/05	4/07	5/07	5/08
UNEX-12	2/04	9/04	10/04	2/05	N/A	8/05	4/07	5/07	5/08
UNEX-13	2/04	9/04	10/04	6/05	N/A	4/06	4/08	5/08	5/09
UNEX-14	2/04	9/04	10/04	6/05	N/A	4/06	4/08	5/08	5/09
<u>STEDI</u>									
TERRIERS	USRA 1995								
CATSAT	USRA 1995						4/8/99	5/99	5/00
							7/01	8/01	8/02
<u>Miss.</u>									
<u>Opp'y</u>									
HETE-II	1997 Decision		6/97	10/97					
TWINS - A	4/16/97	9/97	10/97			3/98	1/00	2/00	2/01
TWINS - B	4/16/97	9/97	10/97			4/99	4/02	5/02	5/06
						4/99	4/04	5/04	5/08

## **6. COST COMMITMENTS**

The NASA total mission costs (initial selection through end of primary mission) for each investigation shall be limited to the following:

MIDEX	\$150M	(FY 2000 dollars)
SMEX	\$75M	(FY 2000 dollars)
UNEX	\$7.5M	(Real Year dollars)
MO	\$35M	(FY 2000 dollars)

The Explorer Technology Initiative funding shall be at least \$5M per year in FY 2000 dollars.

## **7. ACQUISITION STRATEGY**

To reduce the number of procurement activities the team has to perform, the Explorers program has established an acquisition strategy that contracts for whole missions (concept through delivery of the science data and analysis) versus the usual strategy of separate procurements of each individual phase. Strong emphasis will be placed on contracts with performance incentives, especially flight and science instrument performance. Explorer investigations will be selected through the AO process, where multiple investigations are selected for Phase A Concept Studies with a competitive down select to proceed to the Phase B part of Formulation. Investigations will typically be selected to proceed from one phase to the next phase through execution of contract options based on successful technical, cost and schedule performance in previous phases. This success is measured by a NASA Space Science Confirmation Review, at the end of each contract phase, to determine whether to confirm the mission for the next phase. The Confirmation Review for proceeding from Formulation to Implementation will usually be held concurrently with or soon after the Preliminary Design Review. The NASA AA/OSS will make all final decisions to proceed to follow-on phases.

## **8. PROGRAMMATIC RISK AREAS**

Technical, management and cost risks for each Explorer investigation will be carefully examined as part of the selection process, and accepted risks are documented in individual Project Appendices attached to the Explorer Program Plan. All technical/programmatic risks will be further reviewed as part of the Project Confirmation Review conducted during the PDR timeframe to assure risks have been reduced to an acceptable level prior to entering detailed design and development.

## **9. INTERNAL NASA AGREEMENTS**

The NASA Goddard Space Flight Center has been assigned lead center responsibility for the Explorer Program.

The Space Operations Management Office (SOMO) will support the AO and evaluation process according to the agreements in "NASA Mission Operations and Communication Services (for Explorer Missions)" dated February 1998. Since individual projects are encouraged to use the most cost-efficient communication and ground data handling services, SOMO will work with the Space Science Enterprise and individual projects when existing NASA assets are required.

The Kennedy Space Center will support the AO and evaluation process in the area of launch services, as well as provide government furnished services and products to approved Explorer projects. Each project will be supported by KSC as defined in individual project documentation.

## **10. EXTERNAL AGREEMENTS**

There are no external agreements for the Explorers program. External agreements for individual Explorer projects will be generated when necessary and are referenced in the Project Appendices to the Explorers Program Plan.

## **11. INDEPENDENT EVALUATION**

Because of the relatively low cost and short development schedules of Explorer projects, the Confirmation Review substitutes for the Non - Advocate Reviews (NAR) and no Independent Annual Review (IAR) will be held for Explorer projects. No other independent evaluation is required.

However, as a selected project nears the end of Formulation, the Explorer Program Office will organize and implement an independent confirmation assessment of the project's readiness to transition into implementation. Alternatively, if requested by the Space Science Enterprise Associate Administrator, the Space Science Support Office at Langley Research Center will organize and lead an independent Confirmation Assessment of a project's readiness to transition to Implementation.

Since Explorer projects are selected through a competitive proposal process, and firm cost caps are established upon selection, if at any time during Implementation of a project, the estimated cost-to-complete exceeds the firm cost cap, the Explorer project is subject to a termination review. Cost increases that are completely beyond the control of the Principal Investigator and Project may be an exception that could result in an increase to the cost cap, subject to approval by the Space Science Associate Administrator, without causing a termination review. Such increases would be documented in the appropriate Program Plan appendix. Any resultant changes to

the overall Explorer Program costs will be reflected in an approved change to the PCA.

## **12. TAILORING**

The requirements of NASA Policy Directive 7120.4A and NASA Procedures and Guidelines 7120.5A are tailored to effect frequent, low-cost, focused space science missions that will perform high-quality scientific investigations. The Explorer program has adopted a streamlined program management structure, with NASA oversight and reporting requirements limited to that which is essential to assure agreed upon science return in compliance with committed cost, schedule, and performance requirements. Investigator teams will be allowed to use their own processes, procedures, and methods to the fullest extent practical, and are encouraged to develop and implement new ways of doing business when cost, schedule, and technical improvements can be achieved. For example, earned value management will be done only if it is the standard practice of the implementing organization. The intention is to contain total mission life cycle costs and improve performance through the use of new technology, strict cost control, requirements control, and more efficient management by assigning increased responsibility to the PI's.

No IARs or EIRRs are held for the Explorer Program or individual projects within the Program.

The Explorer program will select projects as detailed in Section 7, Acquisition Strategy, above. Each Project of the Explorer program, chosen from a competitive Phase A downselect, will be subject to a Confirmation Review with the AAOSS for approval to enter Implementation (Phase C). This Confirmation Review takes the place of the Non-Advocate Review referenced in NPG 7120.5A. Additional project-specific tailoring will be documented in the relevant Project Appendix to the Explorer Program Plan.

### 13. PCA Activities Log

[illegible]

PROGRAM COST COMMITMENTS (PCC), \$M										
FOR										
EXPLORER MISSIONS										
COST COMMITMENT CATEGORIES	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	BTC	Responsible AA Signature	
DEVELOPMENT									<i>Ant Hucker</i> 9/9/99	
	Phase A-D	113.5	114.3	105.2	111.3	125.0	167.2	cont.		
OPERATIONS	Mission Operations	5.0	10.3	9.3	10.2	4.6	1.9	cont.		
	Data Analysis	24.3	24.7	38.2	44.8	35.2	28.5	31.6		
	Total	29.3	35.0	47.5	55.0	39.8	31.4	33.5		
OTHER	CofF									
	Launch Services	55.8	81.7	45.8	51.6	57.3	84.9	92.6		
	Tracking & Data							cont.		
	Totals	55.8	81.7	45.8	51.6	57.3				
Totals (PCC)		198.6	231.0	198.5	217.9	222.1	262.3	293.3		

**NOTES:**

- All figures reflect the FY 2000 PFP.

*McKenna* 9/22/99